

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

Amendments to the Claims

Claims 1-33 (previously canceled)

34. (currently amended) A method of printing onto textiles comprising:

removing fibers that can cause fuzz, dust or lint from the surface of the substrate;

then

ink jet printing onto the substrate.

35. (original) The method of claim 34 wherein:

the removing of the fibers includes shaving the surface of the substrate.

36. (original) The method of claim 34 wherein:

the removing of the fibers includes singeing the surface of the substrate.

37. (original) The method of claim 34 wherein:

the removing of the fibers is performed on the substrate when supported on the
frame of a printing machine; and

the printing is carried out while the substrate is still supported on the frame of the
printing machine.

Claims 38-47 (previously canceled)

48. (currently amended) A method of printing onto porous textiles comprising:

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

providing a substrate ~~support with a layer of having a~~ non-stick protective material surface;

supporting a textile having pores therein above the ~~substrate support with the layer of non-stick protective sheet material~~ surface of between the substrate support and the substrate;

jetting UV curable ink onto the substrate with some of the ink passing through the pores of the substrate onto the ~~layer of non-stick material~~ surface of the substrate support;

exposing the jetted UV curable ink on the non-stick material surface of the substrate support to UV light;

removing the substrate from above the support;

wiping exposed UV curable ink from the ~~layer of protective sheet material~~ on the substrate support.

49. (currently amended) The method of claim 48 wherein:

the non-stick ~~protective material~~ is a coating of material on the support to which UV ink, jetted thereon and at least partially cured, has an adhesive force sufficiently high to prevent such ink from being wiped from the coating by the friction of the substrate sliding over the support, but has an adhesive force that is, or can be made, sufficiently low to allow such ink to be cleaned from the support; and

the textile is supported on the substrate support in contact with the ~~layer of non-stick protective sheet material~~.

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

50. (currently amended) The method of claim 48 wherein:

the supporting of the textile above the substrate support includes extending the substrate in tension, spaced from the substrate support adjacent the ~~layer of non-stick protective sheet material~~ at least in a region between the printhead and the substrate support.

51. (currently amended) An ink jetting printing apparatus comprising:

a ~~substrate~~ table;

a layer of non-stick protective material overlying the table so as to collect, and protect the ~~substrate support table~~ from, ink jetted toward a porous substrate over the table and passing through the porous substrate;

an ink jet printhead directed toward the table;

a ~~curable~~ UV curing head positioned adjacent the table to facilitate the curing of ink jetted from the printhead toward a substrate over the table and passing through pores in the substrate and onto the table.

52. (original) The apparatus of claim 51 wherein the non-stick protective material is TEFLON.

53. (original) The apparatus of claim 51 wherein the curing head includes a primary UV light curing source positioned to expose ink that has been jetted onto a substrate over the table.

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

54. (original) The apparatus of claim 53 wherein the curing source is mounted on or near a carriage on which the printhead is mounted so as to cure ink immediately after it reaches the substrate so that the dots of ink are frozen before they have a chance to flow into the substrate or spread.

55. (original) The apparatus of claim 53 wherein the UV source has a focal length sufficiently long so that the light penetrates holes in the substrate and cures ink on the underlying layer.

56. (original) The apparatus of claim 51 wherein the non-stick protective material is a coating of material on the table to which UV ink, jetted thereon and at least partially cured, has an adhesive force sufficiently high to prevent such ink from being wiped from the coating by the friction of the substrate sliding over the table, but has an adhesive force that is, or can be made, sufficiently low to allow such ink to be cleaned from the table.

57. (original) The apparatus of claim 51 further comprising:
guide structure configured and positioned to support the substrate proximate to but out of contact with the non-stick protective material at least in a region between the printhead and the substrate table.

58. (original) The apparatus of claim 57 wherein:

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

the guide structure includes transversely extending sets of pinch elements, one set located upstream of the printhead and one set located downstream of the printhead, to hold the substrate in tension proximate but out of contact with the table.

59. (original) The apparatus of claim **57** wherein:

the guide structure includes transversely extending pairs of rollers, one pair located upstream of the printhead and one pair located downstream of the printhead, to hold the substrate proximate but out of contact with the table.

60. (original) An ink jetting printing apparatus comprising:

- a substrate support;
- a layer of non-stick protective material overlying the support so as to collect, and protect the substrate support from, ink jetted toward a porous substrate on the support and passing through the porous substrate;
- an ink jet printhead directed toward the support;
- a curable head positioned adjacent the support to facilitate the curing of ink jetted from the printhead toward a substrate on the support.

61.(currently amended) An ink jet printing apparatus comprising:

- an ink jet printhead configured to jet UV curable ink onto a substrate;
- a UV curing head configured to at least partially cure UV curable ink jetted onto the substrate; and

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

a heated surface-platen configured to physically and thermally contact the substrate having the at least partially cured UV curable ink thereon.

62.(currently amended) The apparatus of claim 61 wherein:

the heated surface-platen is a heated stainless steel bullnose platen.

Claims 63-64. (canceled)

65. (currently amended) ~~The method of claim 64 further comprising:~~

A method of printing onto textiles comprising:

supporting a textile having pores therein;

jetting ink onto the substrate with some of the ink passing through the pores of the substrate;

the supporting of the textile includes extending the substrate in tension to form a space behind the substrate so that the ink passing through the pores in the substrate pass through the space away from the surface of the substrate;

providing a support surface behind the substrate with the space formed between the substrate and the support surface, the support surface having a layer of non-stick protective material thereon;

the textile being supported above the support surface with the layer of non-stick protective ~~sheet~~ material between the support surface and the space;

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

~~the jetting includes jetting UV curable ink onto the substrate with some of the ink
passing through the pores of the substrate onto the layer of material;~~

~~removing the substrate to expose the support surface;~~

~~wiping ink from the layer of protective sheet material.~~

the jetting includes jetting UV curable ink onto the substrate with some of the ink
passing through the pores of the substrate onto the layer of material;

exposing the jetted UV curable ink to UV light;

removing the substrate from above the support; and

wiping exposed UV curable ink from the layer of protective ~~sheet~~ material.

Claim 66. (canceled).

67. (previously added) The method of claim [66] 65 wherein the non-stick protective material is TEFLON.

68. (currently amended) An ink jetting printing apparatus comprising:

a substrate table extending through a printing station;

an ink jet printhead at the printing station directed toward the table;

guide structure configured and positioned to support a substrate, for printing thereon at the printing station, proximate to but out of contact with the substrate table at least in a region of the printing station between the printhead and the substrate table, forming a space in

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

said region so that jetted ink passing through the substrate from the printhead and onto the table is out of contact with the back of the substrate.

69. (currently amended) The apparatus of claim 68 further comprising:

a layer of ~~non-stick~~ protective material overlying the table so as to collect, and protect the substrate table from, ink jetted toward a porous substrate over the table and passing through the porous substrate;

an ink jet printhead directed toward the table;

a curable head positioned adjacent the table to facilitate the curing of ink jetted from the printhead toward a substrate over the table.

70. (currently amended) The apparatus of claim 69 wherein the ~~non-stick~~ protective layer of material is TEFLON.

71. (previously added) The apparatus of claim 69 wherein the curing head includes a primary UV light curing source positioned to expose ink that has been jetted onto a substrate over the table.

72. (previously added) The apparatus of claim 71 wherein the curing source is mounted on or near a carriage on which the printhead is mounted so as to cure ink immediately after it reaches the substrate so that the dots of ink are frozen before they have a chance to flow into the substrate or spread.

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

73. (previously added) The apparatus of claim 71 wherein the UV source has a focal length sufficiently long so that the light penetrates holes in the substrate and cures ink on the underlying layer.

74. (previously added) The apparatus of claim 69 further comprising:
the guide structure includes transversely extending sets of pinch elements, one set located upstream of the printhead and one set located downstream of the printhead, to hold the substrate in tension proximate but out of contact with the table.

75. (previously added) The apparatus of claim 69 further comprising:
the guide structure includes transversely extending pairs of rollers, one pair located upstream of the printhead and one pair located downstream of the printhead, to hold the substrate proximate but out of contact with the table.

76.(currently amended) A printing apparatus comprising:
a printing station having an ink jet printhead thereat configured to jet UV curable ink onto a substrate;
a web guide configured and positioned to guide a substrate into the printing station and to maintain in tension through the printing station;
the printing station being configured to provide a gap adjacent the substrate maintained in tension through the printing station on the opposite side of the substrate from the

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

printhead to prevent ink deposited onto the substrate by the printhead and passing through pores or openings in the substrate, from accumulating on the surface of the substrate on the side of the substrate opposite the printhead;

a UV curing light proximate the printhead to at least partially cure UV curable ink jetted on the substrate, the light being positioned to at least partially cure UV curable ink that passes through the pores or openings in the substrate.

77. (previously added) The apparatus of claim 76 further comprising:

a heated surface downstream of the printing station positioned to contact the substrate having ink thereon to heat the substrate and dry ink on the substrate.

78. (previously added) The apparatus of claim 76 further comprising:

heating elements downstream of the printing station to heat the substrate and dry ink on the substrate.

79. (previously added) The apparatus of claim 76 further comprising:

a convex curved heated surface over which the substrate moves downstream of the printing station.

80. (previously added) The apparatus of claim 76 further comprising:

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

a vacuum source which generates a suction on the substrate.

81. (previously added) The apparatus of claim 76 further comprising:

an absorbent layer on the opposite side of the substrate from the printhead
positioned to absorb excess ink on said side of the substrate.

82. (currently amended) The apparatus of claim 76 wherein:

~~the printhead is configured to jet UV curable ink onto the substrate;~~
~~a UV curing light is provided proximate the printhead to at least partially cure UV~~
~~ink jetted on the substrate;~~
a heated surface is provided downstream of the printing station to contact and heat
the substrate having the at least partially cured UV ink thereon.

Claim 83. (canceled).

84. (currently amended) A method of guiding a substrate through a printing system
comprising:

moving the substrate having pores or other openings therethrough through a
printing section of the printing system while applying tension to the substrate;
as the substrate moves through the printing system, [provide] providing a gap
over which the substrate moves to minimize excess ink deposited on the substrate and passing

Application No. 10/675,219
Amendment dated January 12, 2005
Reply to Office Action of Application Filed Herewith

through the openings in the substrate onto a surface behind the substrate from accumulating underneath contacting the backside of the substrate;

heating the substrate after printing on the substrate

at the printing section, jetting UV curable ink onto a substrate, at least some of the UV curable ink passing through the openings in the substrate onto the surface behind the substrate;

exposing the UV curable ink passing through the openings in the substrate to UV light proximate to at least partially cure UV curable ink on the surface behind the substrate.

85. (new) The apparatus of claim 84 wherein:

heating the substrate after printing on the substrate.